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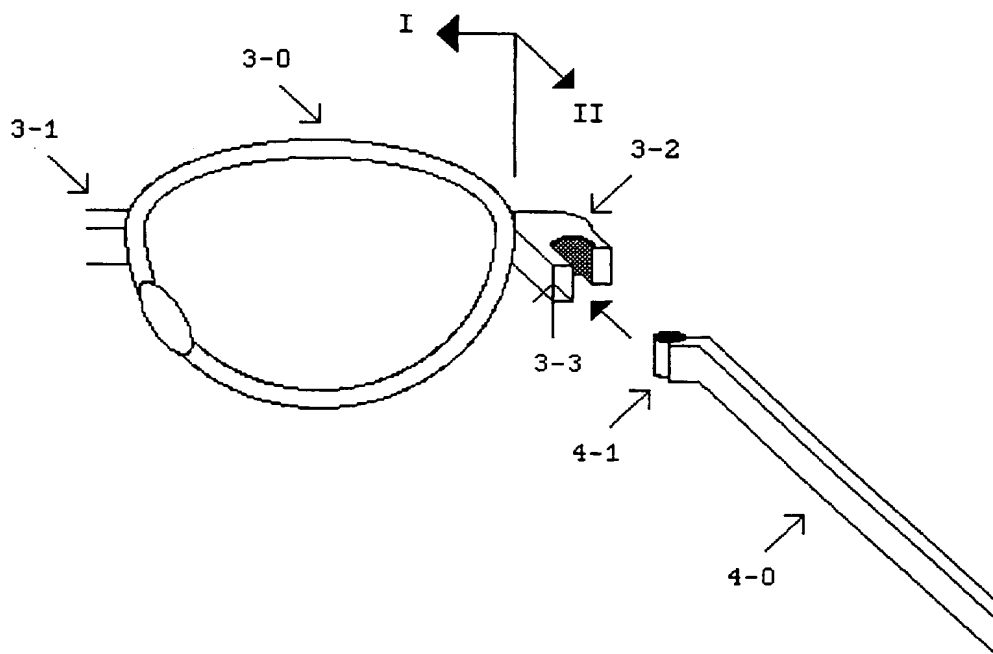
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(71) Demandeur/Applicant:  
SUNATORI, GO SIMON, CA

(72) Inventeur/Inventor:  
SUNATORI, GO SIMON, CA

(54) Titre : MONTURE DE LUNETTES A ARTICULATIONS MAGNETIQUES

(54) Title: EYEGGLASS FRAME WITH MAGNETIC HINGES



(57) Abrégé/Abstract:

An eyeglass frame with magnetic hinges comprises a frame body for supporting a pair of lenses, and a pair of arms. The frame body has 1 middle bridge portion and 2 side extension portions. Each side extension portion has a concave recess and comprises a U-shaped ferromagnetic element securely attached to the concave recess of the side extension portion. Each arm comprises a cylindrical magnetic element securely attached to the proximate end of the arm. The cylindrical magnetic element of each arm is capable of hingedly engaging with the U-shaped ferromagnetic element of each side extension portion of the frame body by a magnetic attraction force. This invention relates to eyeglasses, and the principal use of the invention is for prescription eyeglasses, sunglasses and safety goggles.



**Abstract**

- An eyeglass frame with magnetic hinges comprises a frame body for supporting a pair of lenses, and a pair of arms. The frame body has 1 middle bridge portion and 2 side extension portions. Each side extension portion has a concave recess and comprises a U-shaped ferromagnetic element securely attached to the concave recess of the side extension portion. Each arm comprises a cylindrical magnetic element securely attached to the proximate end of the arm. The cylindrical magnetic element of each arm is capable of hingedly engaging with the U-shaped ferromagnetic element of each side extension portion of the frame body by a magnetic attraction force. This invention relates to eyeglasses, and the principal use of the invention is for prescription eyeglasses, sunglasses and safety goggles.

## Description

### Title

- **Eyeglass Frame with Magnetic Hinges**

### Technical Field

- This invention relates to eyeglasses, more particularly to an eyeglass frame with magnetic hinges.

### Background Art

- There are many instances where it would be desirable to be able to avoid breakage of an eyeglass frame at the hinges between an eyeglass frame body and arms when an excessive physical force is applied.
- A large number of patents disclose eyeglass frames having magnets for attaching clip-on auxiliary lenses to a primary eyeglass frame, e.g., EasyClip (TM), etc.
- **U.S. Patent 5 682 222** discloses "Spectacle frame having magnetic coupling". This prior art has a spectacle frame which includes two extensions extended from the side portions and each having a magnetic member.
- **U.S. Patent 5 321 442** discloses "Eyeglasses with detachable lenses, sidebars, and adjustable earpieces". This prior art has a plurality of interchangeable, removable or replaceable lenses, temple side bars, temple ornaments, colour beaded lenses and adjustable earpiece.
- Some eyeglass frames use a shape-memory material based on nickel-titanium alloy for their bridge and arms, e.g., Flexon (TM), Memoflex (TM), etc.
- These prior art arrangements do not have eyeglass frames with magnetic hinges in order to avoid breakage when an excessive physical force is applied.

### Description of the Invention

- It is a primary object of the invention to provide an eyeglass frame whose hinges do not break when an excessive physical force is applied.
- It is another object of the invention to provide an eyeglass frame whose hinges do not loosen over time.
- It is another object of the invention to provide an eyeglass frame which uses magnetic hinges.
- An eyeglass frame with magnetic hinges comprises a frame body for supporting a pair of lenses, and a pair of arms. The frame body has 1 middle bridge portion and 2 side extension portions. Each side extension portion has a concave recess and comprises a U-shaped ferromagnetic element securely attached to the concave recess of the side extension portion. Each arm comprises a cylindrical magnetic element securely attached to the proximate end of the arm. The cylindrical magnetic element of each arm is capable of hingedly engaging with the U-shaped ferromagnetic element of each side extension portion of the frame body by a magnetic attraction force.

### Brief Description of the Figures in the Drawings

- In drawings which illustrate embodiments of the invention:

- **Figure 1** marked "**Prior Art**" is an exploded perspective view of a conventional eyeglass frame;
- **Figure 2** is an exploded perspective view of one embodiment of an eyeglass frame according to the invention;
- **Figure 3** is a sectional view of the invention along line II-II of **Figure 2**;
- **Figure 4** is an exploded perspective view of another embodiment of an eyeglass frame according to the invention;
- **Figure 5** is a sectional view of the invention along line II-II of **Figure 4**; and
- **Figure 6** is a sectional view of the invention along line I-I of **Figure 2** and along line I-I of **Figure 4**.

#### Modes for Carrying Out the Invention

- One conventional eyeglass frame shown in **Figure 1** marked "**Prior Art**" comprises a frame body 1-0 for supporting a pair of lenses, and a pair of arms 2-0.
- The frame body 1-0 has 1 middle bridge portion 1-1 and 2 side extension portions 1-2.
- A bolt 1-4 mechanically engages a hinge element 1-3 of each side extension portion 1-2 with a hinge element 2-1 of each arm 2-0, forming a mechanical hinge, as indicated by the arrows in the figure.
- Each arm 2-0 is capable of rotating around the mechanical hinge, making an angle between 0 radian (0 degree) and  $\pi/2$  radian (90 degree). The mechanical hinge loosens over time. Moreover, the mechanical hinge breaks when an excessive physical force is applied.
- In one embodiment of the invention shown in **Figure 2**, an eyeglass frame comprises a frame body 3-0 for supporting a pair of lenses, and a pair of arms 4-0. **Figure 3** shows a sectional view of the eyeglass frame along line II-II of **Figure 2** in which one arm is open, and the other arm is folded.
- The frame body 3-0 has 1 middle bridge portion 3-1 and 2 side extension portions 3-2. Each side extension portion 3-2 has a concave recess and comprises a U-shaped ferromagnetic element 3-3 securely attached to the concave recess of the side extension portion 3-2.
- Each arm 4-0 comprises a cylindrical magnetic element 4-1 securely attached to the proximate end of the arm 4-0.
- The cylindrical magnetic element 4-1 of each arm 4-0 is capable of hingedly engaging with the U-shaped ferromagnetic element 3-3 of each side extension portion 3-2 of the frame body 3-0 by a magnetic attraction force, forming a magnetic hinge, as indicated by the arrow in the figure.
- Each arm 4-0 is capable of rotating around the magnetic hinge, making an angle between 0 radian (0 degree) and  $\pi/2$  radian (90 degree). Each arm 4-0 detaches from the frame body 3-0 by magnetic decoupling when an excessive physical force is applied to the magnetic hinge.
- **Figure 4** shows an exploded perspective view of another embodiment of the eyeglass frame. **Figure 5** shows a sectional view of the eyeglass frame along line II-II of **Figure 4** in which one arm is open, and the other arm is

folded.

- In this embodiment of the invention, each side extension portion 3-2 of the frame body 3-0 extends rearwardly in order to support the arm 4-0 when the arm 4-0 is open.
- **Figure 5** shows a sectional view of the eyeglass frame along line I-I of **Figure 2** and along line I-I of **Figure 2** in which the arms are removed.
- The U-shaped ferromagnetic element 3-3 of each side extension portion 3-2 may be made of metallic alloys containing iron (Fe), nickel (Ni), cobalt (Co), manganese (Mn), etc.
- The cylindrical magnetic element 4-1 of each arm may be rod shaped or ring shaped.
- Preferably, the cylindrical magnetic element 4-1 of each arm 4-0 is made of a rare-earth permanent magnet.

**Claims**

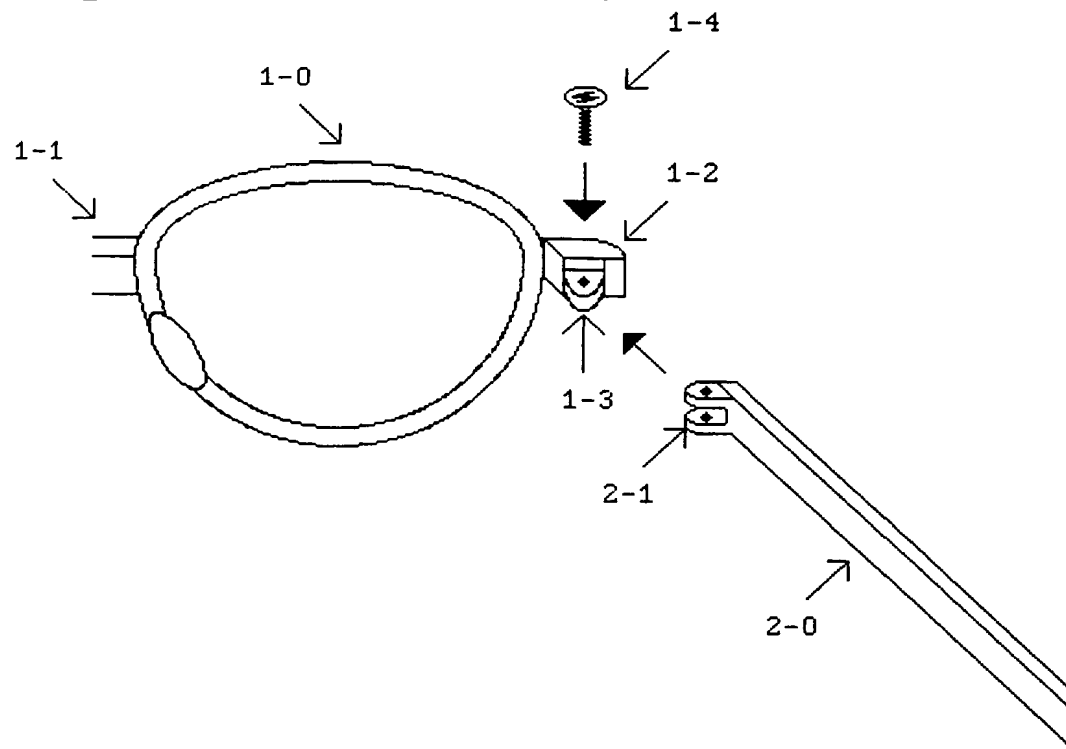
- The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An eyeglass frame, comprising in combination:

- a frame body for supporting a pair of lenses, having 1 middle bridge portion and 2 side extension portions, each side extension portion having a concave recess and comprising:
  - a U-shaped ferromagnetic element securely attached to the concave recess of the side extension portion; and
- a pair of arms, each arm comprising:
  - a cylindrical magnetic element securely attached to the proximate end of the arm;

the cylindrical magnetic element of each arm being capable of hingedly engaging with the U-shaped ferromagnetic element of each side extension portion of the frame body by a magnetic attraction force.

2. An eyeglass frame as defined in claim 1, in which the cylindrical magnetic element of each arm is rod shaped.
3. An eyeglass frame as defined in claim 1, in which the cylindrical magnetic element of each arm is ring shaped.
4. An eyeglass frame as defined in claim 1, in which the cylindrical magnetic element of each arm is made of a rare-earth permanent magnet.

**Figure 1 (Prior Art)**

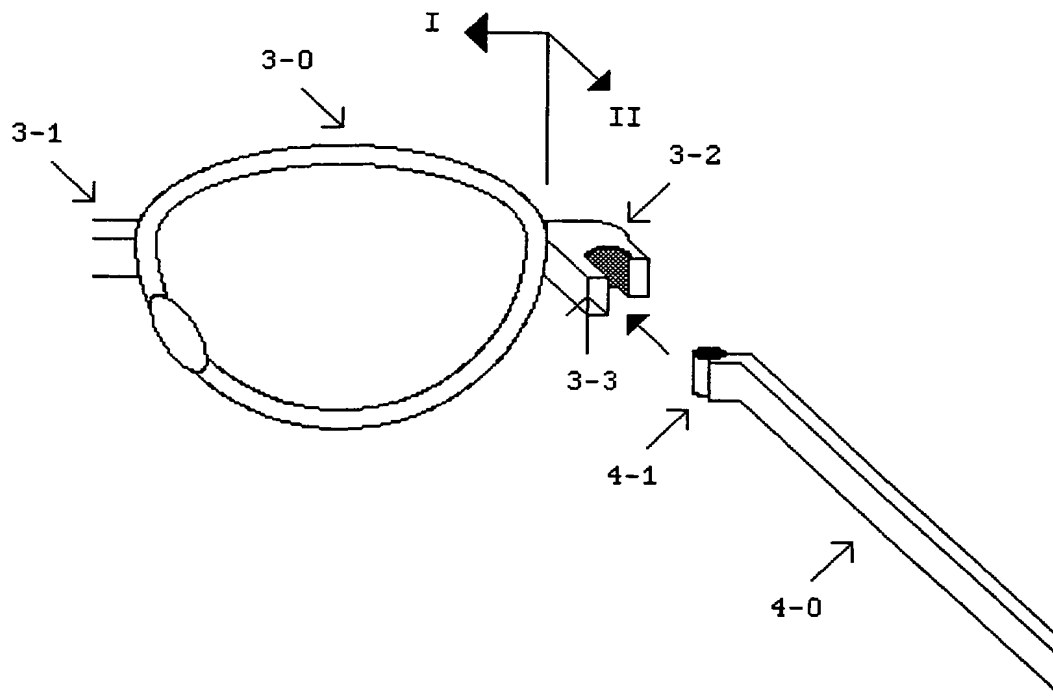
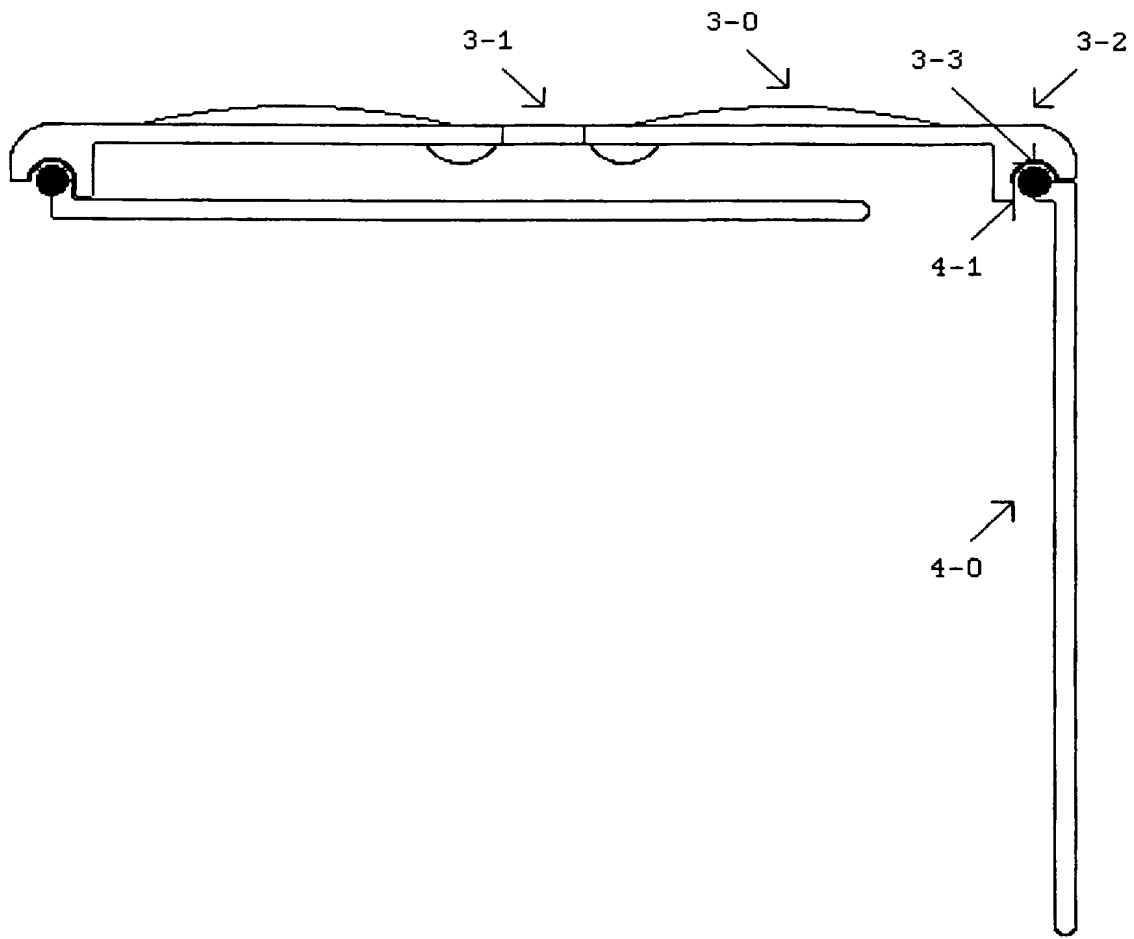
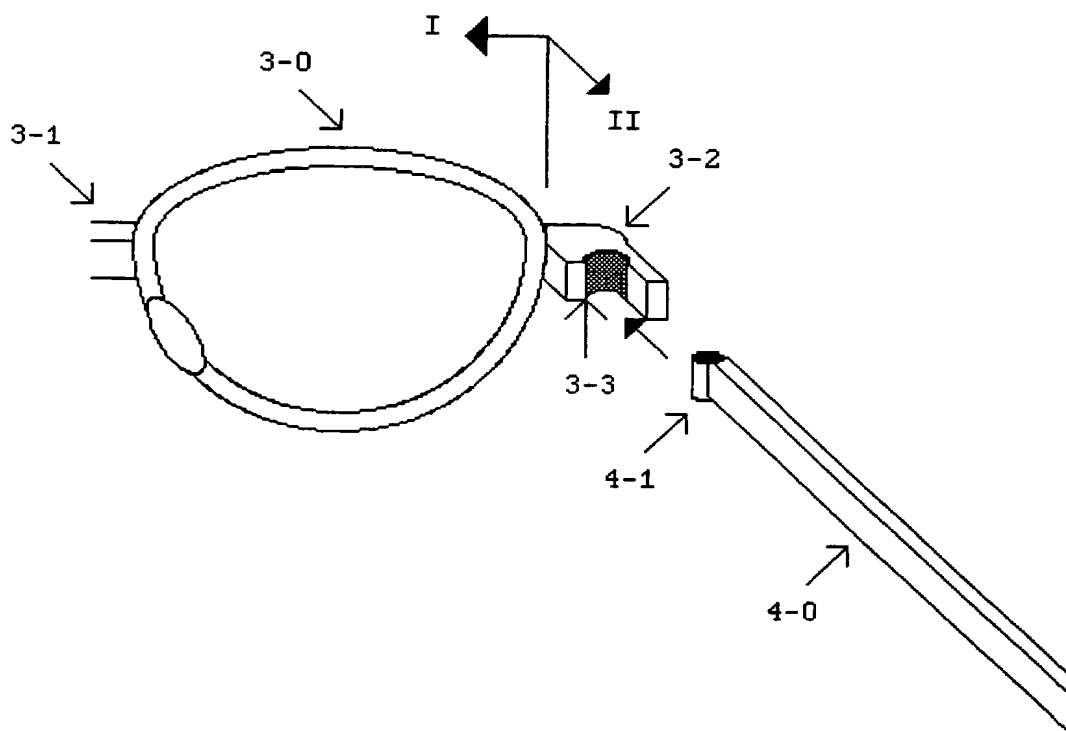
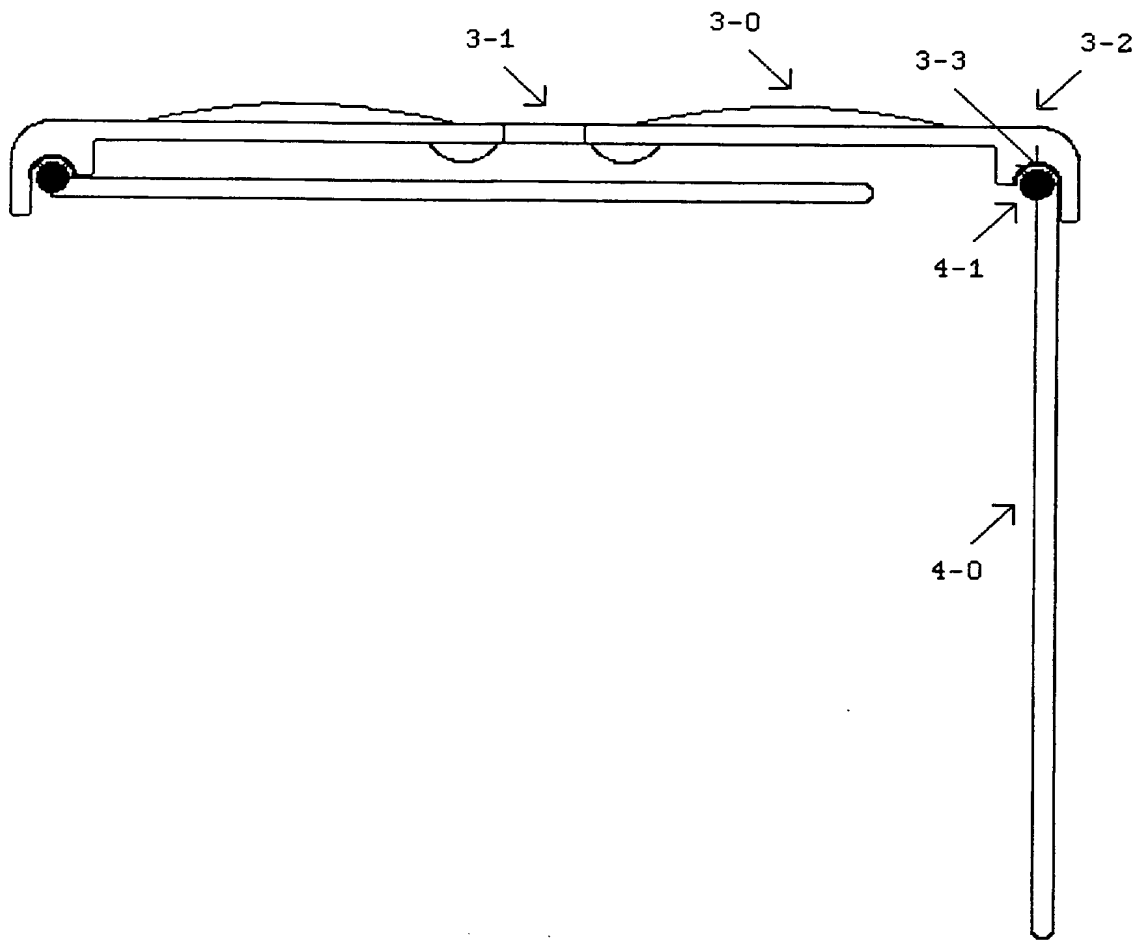
**Figure 2**



Figure 3



**Figure 4**

**Figure 5**

**Figure 6**

